Claims

1. A method for adjusting the sensitivity of a microbial growth inhibition test for detecting the presence of microbial inhibitors in a sample comprising:
a) preparing a microbial culture that will have growth inhibition when contacted with an antibiotic;
b) adding a substance that reduces the culture growth inhibition of the antibiotic;
c) adding the sample to the culture;
d) growing the culture;
e) determining the amount of culture growth,
wherein lack of culture growth reflects the presence of a microbial growth inhibitor and wherein the test sensitivity to the antibiotic is reduced by adding the substance that reduces the culture growth inhibition of the antibiotic.
2. The method of claim 1 further comprising extracting the antibiotic from the sample and adding the extract to culture.
3. The method of claim 2 wherein the extracting comprises adding the sample to a solution comprising Trizma Base.
4. The method of claim 2 wherein the extracting comprises adding the sample to a solution comprising Potassium Phosphate.
5. The method of claim 2 wherein the extracting comprises adding the sample to a solution comprising Potassium Phosphate Monobasic.
6. The method of claim 2 wherein the extracting comprises adding the sample to a solution of pH between about 7.0 to about 8.0.
7. The method of claim 2 wherein the extracting comprises adding the sample to a solution of pH of about 7.5.
8. The method of claim 2 wherein the extracting comprises adding the sample to a solution comprising Potassium Phosphate Monobasic and Trizma Base at a pH of about 7.5.
9. The method of claim 1 wherein the substance that reduces the culture growth inhibition of the antibiotic is combined with the sample prior to adding the sample to the culture.
10. The method of claim 1 wherein the substance that reduces the culture growth inhibition of an antibiotic is added to the culture prior to adding the sample to the culture.
11. The method of claim 1 wherein the inhibition reducing substance reduces the culture growth inhibition of selected, but not all, antibiotics to which the culture is sensitive.
12. The method of claim 1 wherein the antibiotic to be detected comprises a beta-lactam.

13. The method of claim 1 wherein the inhibition reducing substance comprises an antibiotic binder.

14. The method of claim 13 wherein the antibiotic binder comprises an antibody.

15. The method of claim 13 wherein the antibiotic binder comprises a protein.

16. The method of claim 13 wherein the antibiotic binder comprises a beta-lactam receptor isolated from an organism of the genus *Bacillus*.

17. The method of claim 13 wherein the antibiotic binder comprises a beta-lactam receptor from *Bacillus stearothermophilus*.

18. The method of claim 13 wherein the antibiotic binder comprises non-viable *Bacillus stearothermophilus*.

19. The method of claim 1 wherein the inhibition reducing substance competes with an antibiotic in a biochemical pathway through which the antibiotic acts.

20. The method of claim 1 wherein the inhibition reducing substance comprises an antibiotic analogue.

21. The method of claim 20 wherein the antibiotic analogue comprises para-aminobenzoic acid.

22. The method of claim 1 wherein the inhibition reducing substance comprises an antibiotic inactivator.

23. The method of claim 1 wherein the inhibition reducing substance is derived from the microbial family present in the microbial culture.

24. The method of claim 1 wherein growing the culture comprises incubating at above room temperature.

25. The method of claim 1 wherein determining the amount of culture growth comprises observing a color change within the culture.

26. The method of claim 1 further comprising a colorimetric assay in which a color change reflects a change in the pH of the culture.

27. The method of claim 26 wherein the reagents for the colorimetric assay are combined within the microbial culture.

28. The method of claim 1 wherein the microbial culture comprises bacterial spores.

29. The method of claim 28 wherein the spores comprise spores of *Bacillus stearothermophilus*.

30. The method of claim 1 further comprising adding to the microbial culture at least two buffers, wherein one of said at least two buffers has a pKa of above 7 and the other of said buffers has a pKa of below 7.

31. The method of claim 30 wherein one of said at least two buffers has a pKa of about 8 to about 11 and the other of said buffers has a pKa of about 4.5 to about 6.5.

32. The method of claim 30 wherein one of said buffers comprises succinate.

33. The method of claim 30 wherein one of said buffers comprises borate.

34. The method of claim 30 wherein one of said buffers comprises Trizma Base.

35. The method of claim 1 wherein the pH of the microbial culture, prior to adding the sample, is above about pH 7.5.

36. The method of claim 1 wherein the pH of the microbial culture, prior to adding the sample, is above about pH 8.0.

37. The method of claim 1 wherein the pH of the microbial culture, prior to adding the sample, is between about pH 8.0 and about pH 10.5.

38. A method for detection of an antibiotic in a sample comprising:

a) preparing a microbial culture that will have growth inhibition when contacted with an antibiotic;

b) buffering the culture with at least two buffers, wherein one of the buffers has a pKa of above 7 and one of the buffers has a pKa of below 7;

b) adding the sample to the culture;

c) growing the culture;

d) determining the amount of culture growth,

wherein lack of culture growth indicates the presence in the sample of a microbial growth inhibitor.

39. The method of claim 38 wherein the buffers are added to the culture prior to contacting the culture with the sample.

40. The method of claim 38 wherein at least one of the two buffers is added to the culture concurrently with the sample.

41. The method of claim 38 wherein at least one of the two buffers is added to the culture subsequent to adding the sample.

42. The method of claim 38 wherein one of said at least two buffers has a pKa of about 8 to about 11 and the other of said buffers has a pKa of about 4.5 to about 6.5.

43. The method of claim 38 wherein one of said buffers is succinate.

44. The method of claim 38 wherein one of said buffers is borate.

45. The method of claim 38 wherein one of said buffers is Trizma Base.

46. The method of claim 38 further comprising a method for reducing growth inhibition of an antibiotic comprising contacting the culture with a substance that reduces the culture growth inhibition of the antibiotic.

47. The method of claim 38 wherein the pH of the culture, prior to adding the sample, is between about pH 7.5 and about pH 10.5.

48. The method of claim 38 wherein the culture comprises spores of Bacillus stearothermophilus.

49. The method of claim 46 wherein the inhibition reducing substance comprises a protein isolated from *Bacillus stearothermophilus*.

50. The method of claim 38 wherein the culture comprises spores of *Bacillus stearothermophilus* and wherein the inhibition reducing substance comprises a protein isolated from *Bacillus stearothermophilus*.

51. The method of claim 50 wherein the culture is sensitive to beta-lactams and the inhibition reducing substance comprises a beta-lactam binding protein isolated from an organism from the genus *Bacillus*.

51. A method for the microbial culture, growth inhibition, detection of microbial growth inhibitors in a test sample, at reduced sensitivity levels for one or more, but not all, antibiotics to which a culture is sensitive, said method comprising:

a) adding a sample to the culture, the culture comprising spores of Bacillus stearothermophilus, agar, at least two buffers, one of said at least two buffers having a pKa of above 7 and the other of said buffers having a pKa of below 7, a substance that reduces the microbial growth inhibition of an antibiotic, and a pH indicators;

b) incubating the culture with the sample;

c) detecting a change in pH,

wherein a pH below 7 reflects culture growth and wherein culture growth reflects the absence of inhibitors in the sample at above a preset threshold level for certain antibiotics.

52. The method of claim 51 wherein the pH of the culture, prior to sample addition, is about pH 8.

53. A method for detection of an antibiotic in a sample comprising:

a) preparing a microbial culture that will have growth inhibition when contacted with an antibiotic, the culture, prior to use, characterized in that the pH is above about pH 8.0;

b) adding the sample to the culture;

c) growing the culture;

d) determining the amount of culture growth,

wherein lack of culture growth indicates the presence in the sample of a microbial growth inhibitor.

54. The method of claim 53 wherein the pH of the culture is between about pH 8.0 and about pH 10.5.

55. The method of claim 53 further comprising a method for reducing growth inhibition of a selected antibiotic to which the culture is sensitive comprising contacting the culture with a substance that reduces the culture growth inhibition of the antibiotic.

56. The method of claim 53 wherein the culture comprises: pH indicator, glucose, Mueller-Hinton broth, agar and spores.

57. The method of claim 53 wherein the culture comprises spores of *Bacillus stearothermophilus*.

58. The method of claim 55 wherein the substance that reduces the culture growth inhibition of the antibiotic is derived from a microbe of the genus *Bacillus*.

59. A test apparatus for the microbial culture, growth inhibition, detection of microbial growth inhibitors in a test sample, at reduced sensitivity levels for certain antibiotics, said test apparatus comprising:

a) a vial containing a microbial culture, the culture comprising: (i) agar, (ii) spores, (iii) nutrients, (iv) a protein that binds an antibiotic, (v) pH indicator;

b) means to transfer into the vial a sample to be tested for antibiotics,

wherein the test sample is added to the culture and the culture is allowed to grow, and wherein the growth of the culture, or lack thereof, indicates the presence in the sample of microbial growth inhibitors.

60. The test apparatus of claim 59 further comprising a an extraction reagent within a container, the container located within the vial and above the culture, the container comprising: (i) a cylinder having a one open end and an other opposite open end, (ii) a probe-puncturable membrane seal over the open ends to form a sealed compartment, (iii) and an extraction reagent sealed within the sealed compartment.

61. The test apparatus of claim 59 further comprising within the culture at least two buffers wherein one of said buffers has a pKa of above 7 and the other of said buffers has a pKa of below 7.

62. The test apparatus of claim 59 wherein the spores are spores of *Bacillus stearothermophilus*.

63. The test apparatus of claim 59 further characterized in that the antibiotic binding protein comprises a protein isolated from *Bacillus stearothermophilus*.

64. The test apparatus of claim 59 further characterized in that the antibiotic binding protein comprises an antibody.

65. The apparatus of claim 60 wherein the extraction reagent comprises a mixture of Trizma Base and Potassium Phosphate Monobasic.

66. The apparatus of claim 61 wherein one of said buffers is Trizma Base and the other of said buffers is succinate.